Item 110 FY96
04DS1
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PURCHASE DESCRIPTION

OPTICAL TIME DOMAIN REFLECTOMETER (OTDR)

TDFAA-D

1.0 GENERAL This procurement requires a portable, high resolution, solid state, programmable optical time domain reflectometer (OTDR) capable of measuring faults and splices in multimode optical fiber cables at wavelengths of 850 and 1300 nanometers (nm). The OTDR shall be capable of performing calibrated high resolution optical attenuation and distance measurements.

2.0 CLASSIFICATION The equipment shall meet the requirements of MIL-T-28800( ), Type III, Class 5, Style E, for Navy shipboard, submarine and shore applications with the following modifications and exceptions:

a. The non-operating temperature requirement is limited to the range of -40°C to +65°C.

b. The operating temperature requirement is limited to the range of 0°C to +45°C.

c. The Electromagnetic Interference requirements of MIL-T-28800( ) are limited to CE01 (-20 dB), CE03, CS01, CS02 (0.05 to 100 MHz), CS06, RE01 (back panel search excluded), RE02 (14 kHz to 10 GHz), and RS03.

3.0 OPERATIONAL REQUIREMENTS The equipment shall be capable of making measurements within the parameters and accuracies specified herein.

3.1 Light Source

3.1.1 Wavelength: 850/1300 ±20 nm in one or two plug-in modules

3.1.2 Plug-In Module: Light source shall be interchangeable as plug-in module without need to disassemble mainframe.

3.1.3 Fiber/Interface: 62.5/125; ST connector
3.1.3.1 Fiber Patchcords: 3 meter jumpers for connecting from the OTDR ST connector to -
3.1.3.1.1 Connectors: AT&T Biconic | FC | SMA 906
3.1.3.1.2 Bare Fiber: 50/125 | 62.5/125
3.1.3.1.3 Patchcords shall not introduce more than 1.0 dB one-way loss.

3.1.4 Dead Zone
3.1.4.1 Attenuation (recovery to within 0.1 dB of linear backscatter for -20 dB reflectance)
3.1.4.1.1 850 nm ≤ 6 m
3.1.4.1.2 1300 nm ≤ 17 m
3.1.4.2 Event: ≤ 4 m (1.5 dB recovery from saturated Fresnel reflection)

3.2 Vertical Axis: Attenuation/Loss Parameters

3.2.1 Scale Factor
3.2.1.1 Minimum: 0.5 dB/div or less
3.2.1.2 Maximum: 4.0 dB/div or more

3.2.2 Dynamic Range: defined as the difference between the extrapolated point of the backscatter trace (taken at the power axis) and a level 0.3 dB above 98% of the noise floor expressed in dB for the one-way loss for the OTDR.
3.2.2.1 850 nm: ≥ 10 dB
3.2.2.2 1300 nm: ≥ 7 dB

3.2.3 Resolution: ≤ 0.05 dB

3.2.4 Measurement Modes:
Loss between 2 points
Loss by least squares approximation (LSA)
Loss per unit length

3.3 Horizontal Axis: Distance Measurement

3.3.1 Range: 2 km or less

3.3.2 Accuracy: ≤1.0 m

3.3.3 Marker Resolution: 0.1 m

3.3.4 Index of Refraction
3.3.4.1 Range: 1.4000 to 1.5999
3.3.4.2 Resolution: 0.0001

3.4 Display OTDR shall present the data from measurements in a graphical and alphanumeric form simultaneously on a CRT or High Resolution LCD.

3.4.1 Graphical: Visual observation of fiber characteristic in dB on the vertical axis versus fiber distance in meters on the horizontal axis. Trace shall show entire characteristic or a magnified portion of range.

3.4.2 Alphanumeric: Integral part of graphical display. The following parameters shall be displayed:

(1) Date	(8) Marker distance
(2) Title (manual entry)	(9) Pulse width
(3) Distance range	(10) Index of refraction
(4) Horizontal scale (m/div)	(11) Distance between markers (m/km)
(5) Vertical scale (dB/div)	(12) Splice loss (dB)
(6) Horizontal trace start distance	(13) Loss between markers (dB)
(7) Optical wavelength	(14) Fiber loss (dB/km)

Note: Alphanumeric data must appear with data recalled from storage.

3.4.2.1 Annotation of Display: A method of display annotation shall be provided, whereby additional alphanumeric data can be added to the display by the operator. The capability shall exist to add a minimum of thirty-six consecutive characters of alphanumeric data.

3.4.2.2 Markers/Cursors: At least two movable on-screen indicators capable of being positioned at any point on graphical trace with resolution of 0.1 m

3.4.2.3 Loss Measurement
3.4.2.3.1 Two-point: Loss in dB between any two points (markers)
3.4.2.3.2 Least squares approximation
3.4.2.3.3 Slope: Fiber loss per unit distance (dB/km)

3.4.3 Signal Averaging: Noise reduction shall be provided by sequential averaging of fiber signature trace. Parameters of 3.2 and 3.3 shall be achieved within three minutes of signal averaging.

3.5 Data Handling

3.5.1 Hard copy output: A hard copy duplicate of the complete CRT data screen shall be available from an internal printer.

3.5.2 Data Storage: Internal DOS compatible high density 3.5 in. floppy disk drive

3.5.3 IBM compatible OTDR emulation software shall be provided to display and manipulate the data stored on a high density 3.5 in. floppy disk.

3.5.4 The OTDR shall be able to store, recall (from memory or disk), and display at least one trace for comparison with the displayed trace of the system under immediate test.

4.0 GENERAL REQUIREMENTS

4.1 Power Source 115 and 230 Vac ±10%, single phase, at frequencies of 50 and 60 Hz ±10%; 400

Hz ±10% at 115 Vac only, 250 W maximum

4.2 Lithium Batteries Per MIL-T-28800, lithium batteries are prohibited without prior authorization. Requests for approving the use of lithium batteries, including those encapsulated in integrated circuits, shall be submitted to the procuring activity at the time of submission of proposals. Approval shall apply only to the specific model proposed.

4.3 Dimensions Portable, less than 57,950 cm3

4.4 Weight The overall weight of the unit with one plug-in shall not exceed 20 kg (44 lb).

4.5 Calibration Interval The calibration interval shall be 12 months minimum. The equipment shall be within all accuracy requirements specified herein, with a 72% or greater confidence factor following a calibration interval of 12 months.

4.6 RS-232 C Printer Port The unit shall incorporate an EIA RS-232C serial printer port for interconnecting to an external printer, plotter, modem, etc.

4.7 Remote Operation The unit will be capable of remote operation via IEEE-488( ) bus interface. At a minimum, it shall operate as a listener such that all functions except the power on/off switch are controllable.

4.8 Accessories Each patchcord shall be separately packaged in a plastic bag, or equivalent, and shall contain a label identifying the patchcord fiber type and connector type. Patchcords shall be contained in the OTDR cover, accessory pouch, or equivalent.